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MM Docket No. 99-262

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

February 8, 2001

VIDEO SERVICES  
DIVISION  
FEB 9 3 25 PM '01

Mr. James McLuckie  
International Bureau  
Federal Communications Commission  
The Portals II  
445 12<sup>th</sup> Street, S.W., Room 7-B555  
Washington, DC 20554

Dear Mr. McLuckie:

On behalf of Spokane School District No. 81, I hereby transmit the original and four copies of an Engineering Statement which supplements the comments of Spokane School District No. 81 in support of its proposal to substitute DTV \*8 for DTV \*39 for noncommercial educational Television Station KSPS, Spokane, Washington.

On July 21, 1999, the Commission issued a Notice of Proposed Rule Making, MM Docket No. 99-262, RM-9659, which proposed the DTV channel substitution. Spokane filed supporting comments. No objections or counterproposals were filed. The remaining issue is whether Canada will consent to the proposal.

The enclosed Engineering Statement provides an analysis of the impact of the proposal on NTSC Canadian Television Station CKTN-TV, Channel 8, Trail, British Columbia. The Engineer Statement applies the methodology adopted by the Letter of Understanding entered into between the FCC and Canada on September 12, 2000 and concludes that the interference to CKTN reception is confined to unpopulated areas at high elevations in very rugged terrain.


As noted in its comments, the proposed channel substitution will result in enormous benefits to Spokane School District No. 81 by permitting it to operate digital television facilities

Mr. James McLuckie  
February 8, 2001  
Page 2

with a smaller transmitter at a much lower ERP and with its existing physical plant. The cost savings are of particular significance, given Spokane's educational status.

In light of these circumstances, we urge Canada to grant its consent to the proposal.

Respectfully submitted,

  
John Crigler

JC:ab  
Enclosure  
cc: Pam Blumenthal

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ENGINEERING STATEMENT

AMENDMENT TO PETITION FOR RULEMAKING  
IN MM DOCKET NO. 99-262

TO AMEND SECTION 73.622 OF THE RULES  
AND REGULATIONS FOR THE  
FEDERAL COMMUNICATIONS COMMISSION

TO ASSIGN DTV CHANNEL 8  
FOR USE AT SPOKANE, WASHINGTON

SPOKANE SCHOOL DISTRICT #81

FEB 2001

## **ENGINEERING STATEMENT**

This Engineering Statement has been prepared on behalf of Spokane School District #81 ("SSD"), in support of a Petition for Rulemaking to amend §73.622 of the Federal Communications Commission's Rules to assign DTV Channel 8 in lieu of DTV Channel 39 for use by KSPS(TV) at Spokane, Washington.

The proposed substitution of DTV Channel 8 for DTV Channel 39 will allow SSD to utilize a single antenna for both NTSC Channel 7 and DTV Channel 8 operation. It will also allow KSPS(TV), a non-commercial television station and PBS affiliate, to operate its digital television facility with a smaller, less expensive transmitter and at a much lower ERP. This will result in a significant savings on the station's electrical utility bill, and will allow the station to devote a greater share of its annual budget to the acquisition and broadcast of quality programming.

### **Purpose of This Engineering Statement**

The purpose of the instant engineering statement is to provide additional analysis with respect to interference which may be caused to the operation of NTSC station CKTN-TV on Channel 8 at Trail, British Columbia.

On September 12, 2000, the Federal Communications Commission and Industry Canada signed a Letter of Understanding ("LOU"), which outlines the methodology to be followed when evaluating DTV allotment proposals which do not meet the spacing requirements in Appendix 2 of the LOU. The LOU outlines the use of Longley-Rice analysis techniques to evaluate

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interference in such cases. The original Petition for Rulemaking in this proceeding included a Longley-Rice analysis similar to that described in the LOU, but did not follow the specific guidelines of the LOU since that document was not signed until nearly two years after the original Petition for Rulemaking was filed.

### **Interference Study Methodology**

The time-shared "HDTV" computer program offered by the National Telecommunications and Information Administration's *TA Services* in Boulder, Colorado was employed as the method for coverage and interference prediction. The "HDTV" computer program has been developed in close coordination with the FCC's Office of Engineering and Technology staff, and utilizes similar methodology to the computer program used by the FCC to develop the DTV Table of Allotments. It is believed that the "HDTV" program offered by *TA Services* is compliant with the FCC's Office of Engineering and Technology Bulletin 69 Longley-Rice Methodology for Evaluating TV Coverage and Interference ("OET-69"), July 2, 1997.

Longley-Rice computer program input data for the proposed Spokane DTV-8 allotment, following the guidelines established under OET-69, is supplied as Table 1. Input data for the CKTN-TV NTSC Channel 8 authorization is supplied as Table 2.

In conducting this analysis, CKTN-TV was assumed to operate omnidirectionally<sup>1</sup> with its authorized facilities of 18 kilowatts at 480 meters HAAT. These facilities are equivalent to maximum facilities for a Canadian Class R NTSC station operating in the upper VHF band.

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<sup>1</sup>The actual CKTN-TV authorization is for directional operation.

CKTN-TV was presumed to have protected service at all locations which a) were predicted to receive Grade B 56 dBu F(50,50) service, and b) were within 82 kilometers of the CKTN-TV transmitter site, excepting those areas falling within the United States. Analysis was made using 3-second terrain data for locations within Canada and within the United States.

Receiving antennas were presumed to be oriented towards CKTN-TV. The "HDTV" software assumes a 6 dB Front-to-Back ratio for analog High VHF receiving antennas. This is the correct Front-to-Back ratio for analog High VHF per OET-69, which also specifies a High VHF DTV receiver Front-to-Back ratio of 12 dB. 12 dB is also the High VHF Front-to-Back ratio specified in Appendix 2 of the LOU, but that is believed to apply specifically to High VHF DTV, rather than analog, receiving antennas. Nevertheless, even if the LOU is interpreted to require a 12 dB Front-to-Back ratio for reception of analog CKTN-TV, the 6 dB Front-to-Back ratio used in this study presents a more conservative or "worst case" analysis.

### **CKTN-TV Coverage Analysis**

To establish "baseline" data, an analysis was first made of the CKTN-TV predicted Grade B 56 dBu F(50,50) coverage. The results of this analysis are shown in Table 3 and on the attached Map 1. On this map, green shading indicates areas which are predicted to receive a 56 dBu F(50,50) signal from CKTN-TV. Trail is located in an extremely rugged and mountainous region, where habitable areas are limited to relatively narrow strips of land along the Columbia and Kootenai Rivers, and other small rivers which ultimately feed into the Columbia. As Map 1 demonstrates, this rugged terrain restricts the coverage of CKTN-TV to a considerable

degree, even presuming (as has been presumed for this analysis) that CKTN-TV is operating omnidirectionally.

The "baseline" analysis shows that CKTN-TV, operating omnidirectionally, would provide 56 dBu or better service to a total of 3,903 km<sup>2</sup>, of which 1,766 km<sup>2</sup> lie within Canada.

### **Interference Analysis**

Following the CKTN-TV coverage analysis, an analysis was made to identify those portions of the CKTN-TV 56 dBu F(50,50) service area which would be subject to interference from the proposed Spokane DTV-8 allotment, assuming a cochannel DTV-into-NTSC D/U ratio of 33.8 dB. The results of this analysis are shown in Table 4 and on the attached Map 2. On this map, green shading indicates areas which would continue to receive CKTN-TV, while pink shading indicates areas which would normally receive CKTN-TV but which would be subject to interference from Spokane DTV-8.

The results of the interference analysis show that CKTN-TV would be subject to interference in areas amounting to 380 km<sup>2</sup>, of which only 83 km<sup>2</sup> lie within Canada.

### **Interference Will Fall Over Unpopulated Areas**

The 83 km<sup>2</sup> interference area comprises 4.7% of the 1,766 km<sup>2</sup> Grade B service area provided by CKTN-TV within Canada. It is noted that this figure is greater than the 2% area interference limit discussed in the LOU. However, the LOU expressly permits consideration of proposals

which cause in excess of 2% area interference, stating in Paragraph 7c that "all requests will be judged for acceptability on a case-by-case basis."

In this particular case, the only Canadian areas which will be subject to interference from the proposed Spokane DTV-8 allotment will be located on uninhabited mountaintop areas. The specific interference locations shown shaded pink on Map 2 have been isolated and are depicted on Map 3 as black squares, overlaid on the Nelson, British Columbia (82F) 1:250,000 scale topographic map. It is clear from this map that the interference falls only on isolated mountaintops. While roads are in some cases shown to pass through the interference areas, a review of larger-scale topographic maps (1:50,000 scale) confirms that those "roads" are either jeep trails, logging roads, or some other type of back-country roads, and that the areas they pass through are uninhabited.

Indeed, the populated areas within the CKTN-TV Grade B service area are clustered along the river valleys of this extremely rugged region. These river valleys are located at an elevation of roughly 1500 feet above mean sea level. By contrast, the predicted interference location elevations are at least twice the elevation of the river valleys, and thus at least twice the elevation of the populated areas. The lowest interference location is at 3458 feet AMSL, and the highest is at 7358 feet AMSL. The mean interference location elevation is 5656 feet AMSL, and the median elevation is 5631 feet AMSL.<sup>2</sup>

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<sup>2</sup>Terrain elevations are taken from the 3-second terrain database.



## **Conclusion**

Based upon the preceding analysis, it is clear that any interference which the proposed Spokane DTV-8 allotment will cause to the operation of CKTN-TV will fall over unpopulated mountaintop areas. The same rugged, mountainous terrain which limits the coverage of CKTN-TV also effectively shields the population receiving CKTN-TV from interference. Therefore, it is believed that the Spokane DTV-8 allotment could operate without risk of actual interference to reception of CKTN-TV, and thus the proposed Spokane DTV-8 allotment is in compliance with the terms of the LOU.

**Table 1**  
**Interference Analysis Input Data**  
**Proposed Spokane DTV-8 Allotment**

Communications System Performance Model  
Input Summary  
6-Nov-98 09:31:38

```

-----
Process Filename: CS038Nov0698C.ques
1) Model: Point-to-point irregular terrain model
2) Output option: Field intensity
3) Length units: Metric (km and m)
4) Service Application: Broadcast
5) Results option: None
   FAX number: 000-000-0000
6) Location variability: 50.00 %
7) Time availability: 10.00 %
8) Situation variability: 50.00 %
10) Frequency: 183.000 MHz
11) Polarization: Horizontal
12) Conductivity: .005 S/m
13) Dielectric constant: 15.0
14) Climate zone: Continental temperate
20) Transmitter name: DKSPS-8
21) Transmitter location:
      Latitude      Longitude
      Deg N        Deg W
      47.5761  47.34.34.0  117.2994  117.17.58.0
22) Xmtr site elevation: 1085.0 m  3559.7 ft
23) Xmtr ant ht AMSL: 1274.00 m  4179.79 ft
23) Xmtr ant ht AGL: 189.00 m  620.08 ft
24) Transmitter radiation option: ERP
24) Effective Radiated Power: 21600.0 W
   Effective Isotropic Radiated Power: 35438.9 W
30) Transmitter ant horiz pattern: Omnidirectional

```

**Table 1**  
**Interference Analysis Input Data**  
**Proposed Spokane DTV-8 Allotment**  
**(Continued)**

32) Transmitter ant vert pattern: Beam tilt. directional

Vertical directional pattern data

No.	Elevation (deg)	Relative field radiation	Gain relative to pattern maximum (dB)
1	-10.00	.15000	-16.48
2	-9.00	.15000	-16.48
3	-8.00	.15000	-16.48
4	-7.00	.15000	-16.48
5	-6.00	.15000	-16.48
6	-5.00	.20000	-13.98
7	-4.00	.21000	-13.56
8	-3.50	.23500	-12.58
9	-3.00	.26000	-11.70
10	-2.50	.46000	-6.74
11	-2.00	.69000	-3.22
12	-1.50	.88000	-1.11
13	-.75	1.00000	.00
14	.00	.88000	-1.11
15	.50	.69000	-3.22

40) Rcvr ant ht above ground: 9.10 m 29.86 ft

56) Corporate name: TA Services

57) Color option: B & W

58) Scale option: No Scale

59) Quality option: High

60) Plot name: LR 50/10

62) Plot center:

Latitude	Longitude
Deg N	Deg W
47.5761 47.34,34.0	117.2994 117.17,58.0

63) Plot size: 550.00 km 341.75 mi

64) Plot Roads option: No Roads

66) Field intensity contour levels:

1) 35 80 dBuV/m

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**Table 1**  
**Interference Analysis Input Data**  
**Proposed Spokane DTV-8 Allotment**  
**(Continued)**

66) Contour Legend label: Field Intensity(dBuV/m)

66) Contour labels and colors:

	Contour levels		Labels		Colors
	-----		-----		-----
1	Less than	35.80	Less than	35.80	Blue
2	Greater than	35.80	Greater than	35.80	Clear

67) Political boundaries: County and State

68) Landmarks: None

**Table 2**  
**Interference Analysis Input Data**  
**CKTN-TV Ch. 8 Trail, BC**

Communications System Performance Model  
Input Summary  
22-Jan-01 14:30:47

-----

Process Filename: CS038Jan2201D.ques

1) Model:	FCC 50.50 Curves
	No Terrain Roughness
2) Output option:	Field intensity
3) Length units:	Metric (km and m)
4) Service Application:	Broadcast
5) Results option:	None
FAX number:	000-000-0000
6) Location variability:	50.00 %
7) Time availability:	50.00 %
8) Situation variability:	50.00 %
10) Frequency:	183.000 MHz
	Frequency offset(+)
11) Polarization:	Horizontal
12) Conductivity:	.005 S/m
13) Dielectric constant:	15.0
14) Climate zone:	Continental temperate
20) Transmitter name:	CKTNTV
21) Transmitter location:	
	Latitude Longitude
	Deg N Deg W
	49.0917 49. 5.30.0 117.8194 117.49.10.0
22) Xmtr site elevation:	1519.3 m 4984.6 ft
23) Xmtr ant ht AMSL:	1606.00 m 5269.03 ft
23) Xmtr ant ht AGL:	86.69 m 284.43 ft
24) Transmitter radiation option:	ERP
24) Effective Radiated Power:	18000.0 W
	Effective Isotropic Radiated Power: 29532.4 W
30) Transmitter ant horiz pattern:	Omnidirectional

**Table 2**  
**Interference Analysis Input Data**  
**CKTN-TV Ch. 8 Trail, BC**  
**(Continued)**

32) Transmitter ant vert pattern: Beam tilt, directional

Vertical directional pattern data

No.	Elevation (deg)	Relative field radiation	Gain relative to pattern maximum (dB)
1	-9.00	.17000	-15.39
2	-8.00	.22000	-13.15
3	-7.00	.31000	-10.17
4	-6.00	.37000	-8.64
5	-5.00	.37000	-8.64
6	-4.00	.37000	-8.64
7	-3.00	.37000	-8.64
8	-2.50	.47000	-6.56
9	-2.00	.60000	-4.44
10	-1.50	.73000	-2.73
11	-1.00	.86000	-1.31
12	-.50	.95000	-.45
13	.00	1.00000	.00
14	.50	.95000	-.45
15	1.00	.86000	-1.31

40) Rcvr ant ht above ground: 9.10 m 29.86 ft

56) Corporate name: TA Services

57) Color option: Color

58) Scale option: No Scale

59) Quality option: High

60) Plot name: FCC 50/50

62) Plot center:

Latitude

Longitude

Deg N

Deg W

49.0917 49. 5.30.0

117.8194 117.49.10.0

63) Plot size: 350.00 km 217.48 mi

64) Plot Roads option: No Roads

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**Table 2**  
**Interference Analysis Input Data**  
**CKTN-TV Ch. 8 Trail, BC**  
**(Continued)**

66) Field intensity contour levels:

- 1) 56.00 dBuV/m
- 2) 71.00 dBuV/m

66) Contour Legend label: Field Intensity(dBuV/m)

66) Contour labels and colors:

	Contour levels	Labels	Colors
	-----	-----	-----
1	Less than 56.00	Less than 56.00	Blue
2	56.00 to 71.00	56.00 to 71.00	Green
3	Greater than 71.00	Greater than 71.00	Clear

67) Political boundaries: County and State

68) Landmarks: None

**Table 3**  
**Results of CKTN-TV Coverage Analysis**

Population breakdown by State and County (US 1990 Census)  
(Canadian Census figures not available)

Signal Level: 56.00 to 71.00 dBu

STATE = ID	POPULATION	AREA(km)	HOUSEHOLDS
Bonner County	0.	.99	0.
State total =	0.	.99	0.
STATE = WA	POPULATION	AREA(km)	HOUSEHOLDS
Ferry County	221.	303.51	80.
Pend Oreille County	78.	136.88	31.
Stevens County	2021.	659.93	741.
State total =	2320.	1100.31	852.
Total US Population/Area:	2320.	1101.30	852.
Total Population/Area:	2320.	1805.48	852.
Total Canadian Area:		704.18	

Signal Level: Greater than 71.00 dBu

STATE = WA	POPULATION	AREA(km)	HOUSEHOLDS
Ferry County	263.	263.57	92.
Pend Oreille County	87.	137.75	33.
Stevens County	1369.	633.77	482.
State total =	1720.	1035.09	608.
Total US Population/Area:	1720.	1035.09	608.
Total Population/Area:	1720.	2097.09	608.
Total Canadian Area:		1062.00	

Total Canadian Area Receiving 56.00 dBu or Better: 1766.18 sq km



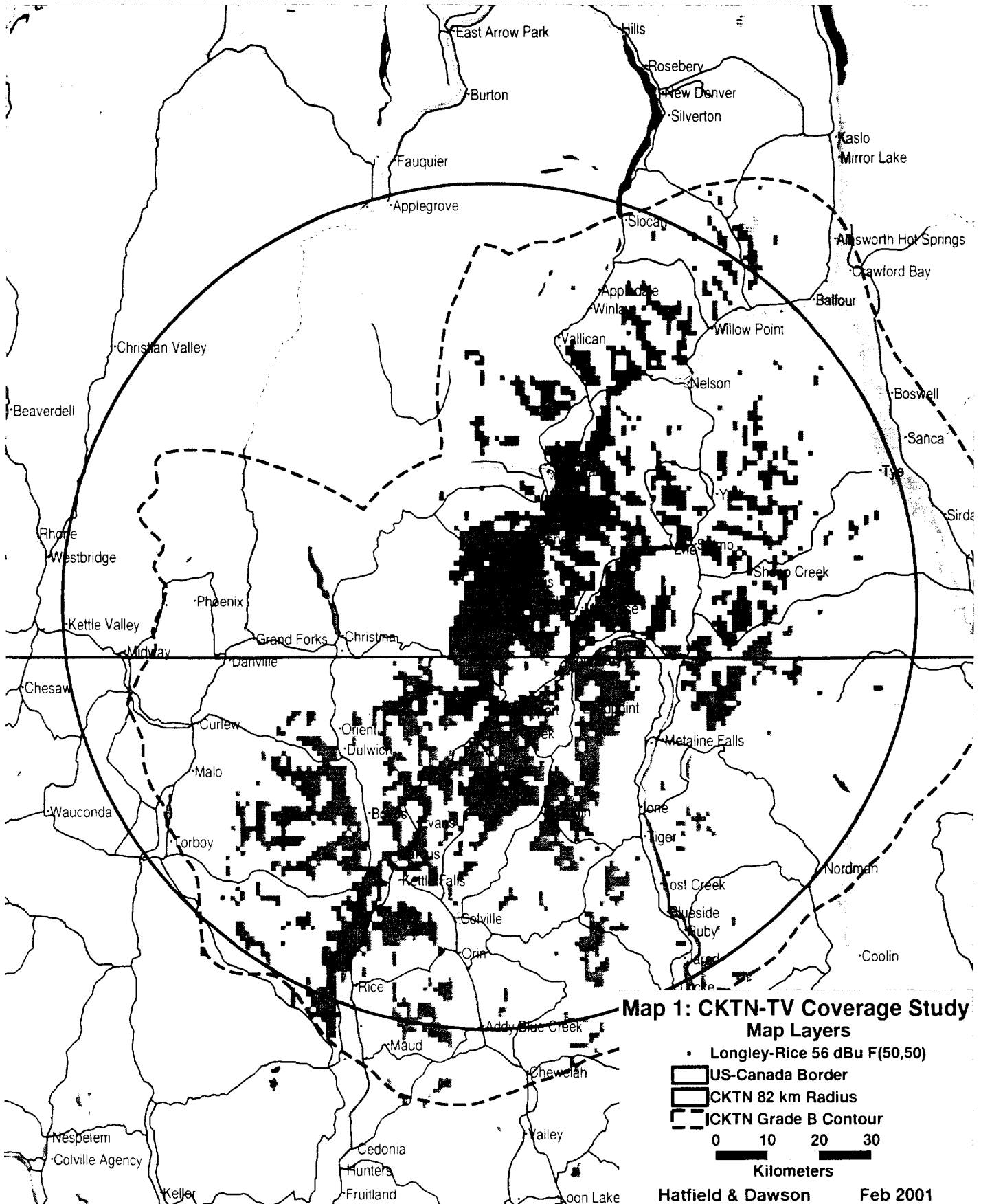
**Table 4**  
**Results of Interference Analysis**

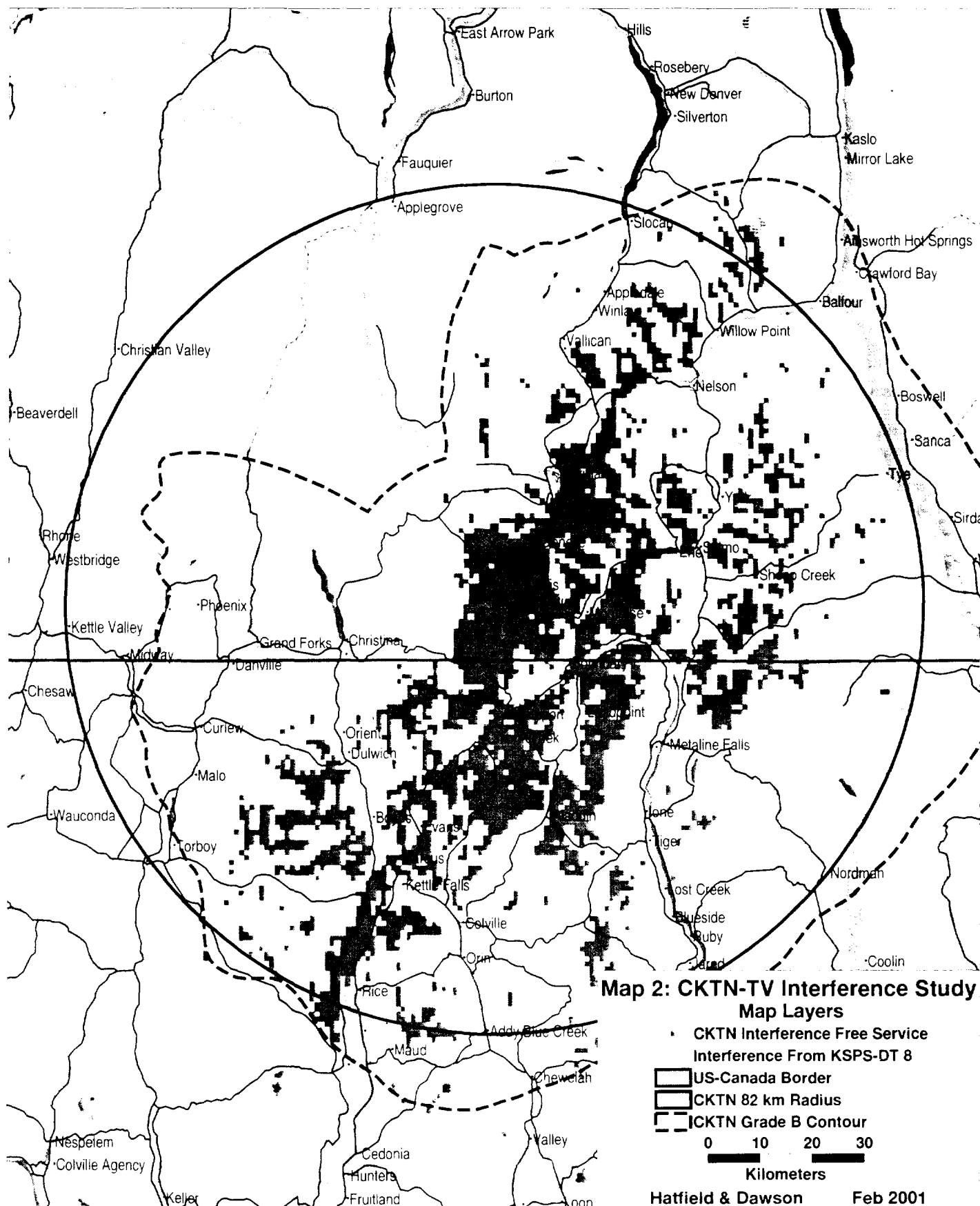
Level 1: Interference from Spokane DTV-8

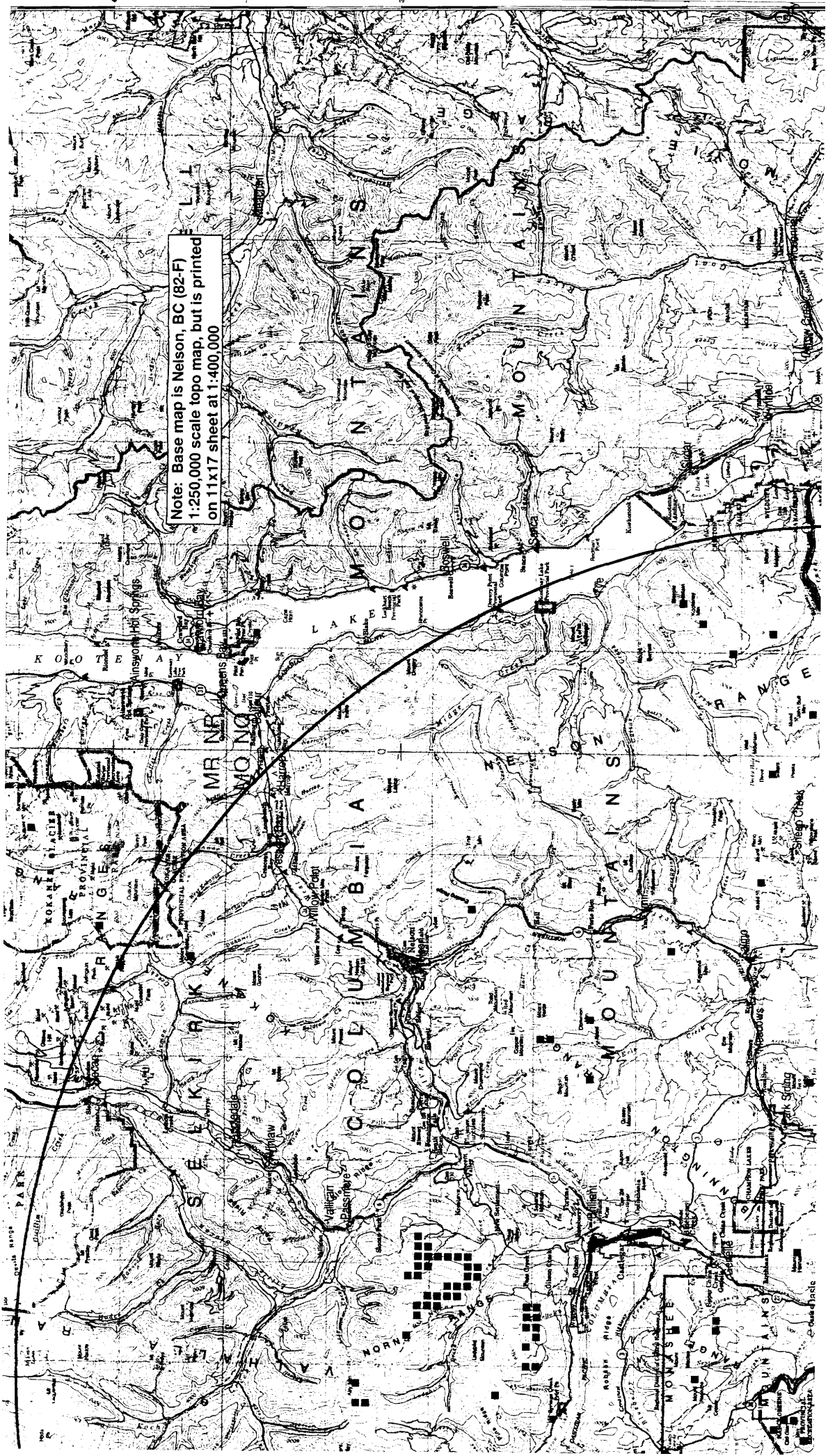
STATE = ID	POPULATION	AREA(km)	HOUSEHOLDS
Bonner County	0.	.99	0.
State total =	0.	.99	0.
STATE = WA	POPULATION	AREA(km)	HOUSEHOLDS
Ferry County	81.	134.14	28.
Pend Oreille County	28.	38.79	11.
Stevens County	480.	122.93	163.
State total =	589.	295.86	202.
Total US Population/Area:	589.	296.85	202.
Total Population/Area:	589.	380.17	202.
Total Canadian Area:		83.32	

Level 2: No Interference

STATE = WA	POPULATION	AREA(km)	HOUSEHOLDS
Ferry County	405.	436.18	145.
Pend Oreille County	138.	234.71	53.
Stevens County	2915.	1171.88	1063.
State total =	3458.	1842.76	1261.
Total US Population/Area:	3458.	1842.76	1261.
Total Population/Area:	3458.	3526.96	1261.
Total Canadian Area:		1684.20	





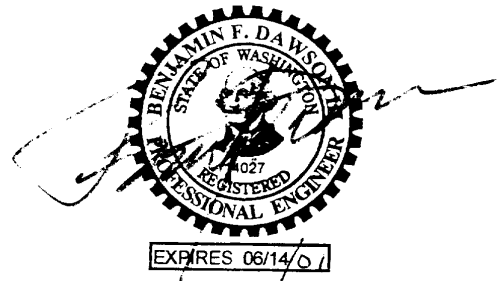


Note: Base map is Nelson, BC (82-F)  
1:250,000 scale topo map, but is printed  
on 11x17 sheet at 1:400,000

**Statement of Engineer**

This Engineering Statement, supporting a Petition for Rulemaking to revise the Table of Allotments to specify DTV Channel 8 in lieu of DTV Channel 39 for use at Spokane, Washington, has been prepared on behalf of Spokane School District #81. All representations herein are true to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission. I am a partner in the firm of Hatfield & Dawson Consulting Engineers and am Registered as a Professional Engineer in the States of Washington and California.

Signed this 6<sup>th</sup> day of February, 2001.



Benjamin F. Dawson III, P.E.

Hatfield & Dawson Consulting Engineers